

4th Quarter 2007 Progress Report

Reporting Period: October 1, 2007 to December 31, 2007

Axial Capacity of Piles in Intermediate Geomaterials

MDT Project No. 8117-32, MSU Project No. 4W0961

Submitted by:

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Task 1: Project Management/Administration

This report summarizes project research activities of the 4th quarter 2007 (October 1 – December 31). This represents the first written quarterly progress report for the year 2007. Three tele-conferences between the MSU research team and members of the MDT research committee were conducted at the end of the first three quarters of 2007 (May 31, August 6, and October 29). Dr. Mokwa submitted written meeting minutes that summarized pertinent discussions from these tele-conferences.

At the request of the MDT research committee, we have appended to this progress report a DRAFT working outline that will be used to develop the final report. It is submitted to provide a glimpse of the work that has been accomplished, and it provides a rough outline of the final report that will be submitted at a later date. Any general comments from MDT on this DRAFT working outline will be greatly appreciated.

Throughout the project, Dr. Mokwa has overseen the various tasks associated with the project. Weekly meetings were held between Dr. Mokwa and the graduate research assistant (Heather Brooks).

Task 2: Literature Review

The background literature review is essentially complete; however, if a topic requires greater understanding or additional information, the literature review will be expanded as necessary. Review topics included: engineering characteristics of Intermediate Geomaterials (IGMs), deep foundation design in IGMs, wave equation analysis, case studies that provide data for comparison between CAPWAP and static load test results, GRLWEAP background information, and DRIVEN background methods. The appended DRAFT outline provides additional details on the literature review.

Task 3: Data Collection

Project data was collected and compiled for analysis with the help of personnel from the MDT geotechnical engineering group. Information and data were obtained from various sources, including: engineer analysis/design calculations, pile driving hammer approval memos, design reports, contract plans and, if available, pile driving analyzer (PDA) reports. Compilation of project data is complete.

Task 4: Analysis and Synthesis of Results

On-going research involves analyses using the computer programs GRLWEAP and DRIVEN, with a focus on matching the design inputs in DRIVEN to the outputs of GRLWEAP. We continue to appreciate the ongoing cooperation and assistance of the MDT Geotechnical group in compiling the needed information.

Based on analyses conducted to date, we have observed that cohesive IGM's are best modeled using a function of their unconfined compression strength and the strength of cohesionless IGM's should be modeled using a friction angle. In GRLWEAP, a parametric study was conducted to determine the parameter that has the most impact on the final output of the program. The inputs of quake and damping were individually varied for the IGM layer, and the effects of relative changes to these variables were compared. It was found that varying damping had the greatest effect on the final pile-driving blow count calculated by the program.

A spreadsheet has been developed to track each iteration of analyses within DRIVEN and GRLWEAP. The spreadsheet will significantly aid in the final compilation of data for this study.

Action Items for Next Quarter:

- * Continue analysis of MDT data.
- * Continue evaluation of data from published case studies.
- * Begin developing written summaries of analyses.

Task 5: Report

Quarterly Progress Reports

Action Items for Next Quarter:

- * Establish a day and time for a tele-conference to discuss any comments on this report and establish a date for the 1st quarter tele-conference that would encompass the period from January 1 through March 31, 2008.

Final Report

Work on the final report is underway. A DRAFT working outline of the report is attached for MDT's internal use. This is a working outline that represents a snapshot of time; it is continually undergoing changes and updates as we advance through the project.

Summary of Expenditures

Table 1 summarizes the expenditures on this project through December 31, 2007. Total dollar expenditures for the project through December 31, 2007 were \$32,609.67, leaving \$7,431.33 for the remainder of the project.

TABLE 1. Budget Summary

Budget Category	Budgeted Funds	Spent Quarter 4-07	Total Spent	Total Remaining
Salaries	\$15,039.00	\$101.62	\$10,938.06	\$4,100.94
Benefits	\$4,525.00	\$32.39	\$2,383.24	\$2,141.76
In-State Travel	\$300.00	\$0.00	\$400.07	(\$100.07)
Out-of-State Travel	\$0.00	\$0.00	\$0.00	\$0.00
Expendable Supplies	\$50.00	\$0.00	\$0.00	\$50.00
Tuition	\$0.00	\$0.00	\$0.00	\$0.00
Subcontracts	\$0.00	\$0.00	\$0.00	\$0.00
MDT Direct Costs	\$19,914.00	\$134.01	\$13,721.37	\$6,192.63
Overhead	\$3,983.00	\$26.80	\$2,744.30	\$1,238.70
MDT Share	\$23,897.00	\$160.81	\$16,465.67	\$7,431.33
WTI/MSU Share	\$16,144.00	\$0.00	\$16,144.00	\$0.00
Total	\$40,041.00	\$160.81	\$32,609.67	\$7,431.33

Project Schedule Summary

An updated summary of the project schedule is shown in Figure 1. The project is essentially on schedule and the budget is on track with anticipated forecasts.

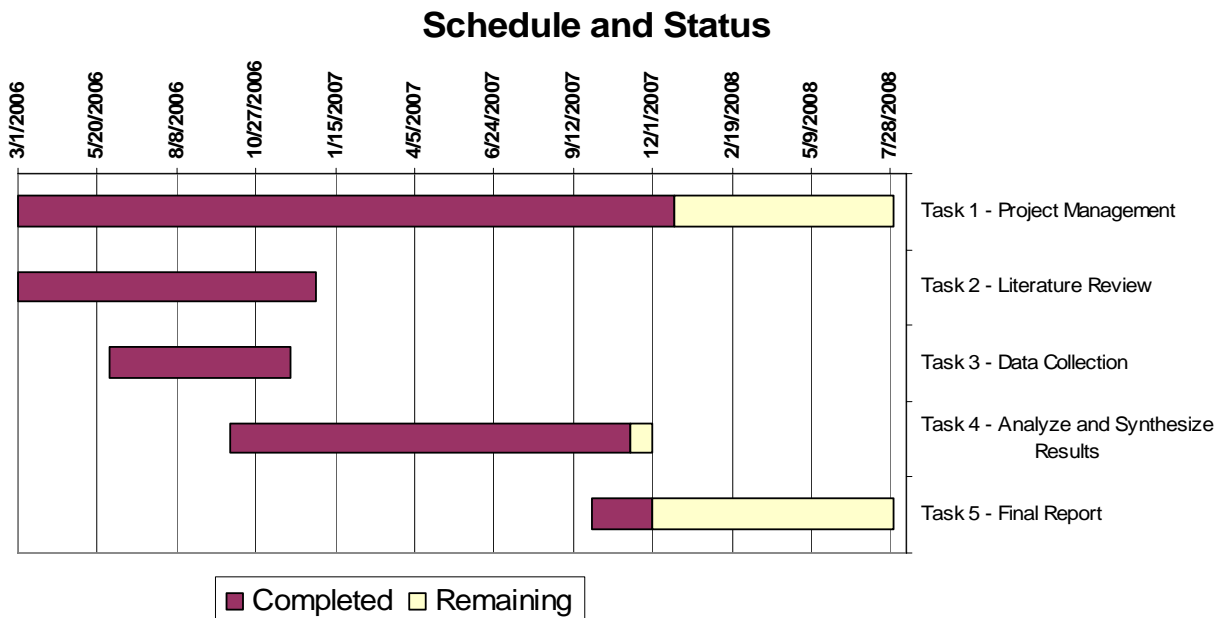


FIGURE 1. Project schedule summary.